

HISTOPATHOLOGICAL CHARACTERISTICS OF GASTRIC CARCINOMA AND ITS RELATION WITH ABO BLOOD GROUP IN KURDISH PEOPLE

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ABSTRACT

Background

Many studies have been done of relationship between blood group and cancers.

Objectives

To evaluate the relationship between ABO blood group system and the risk of gastric cancer with its histopathological features among Kurdish population by case-control study.

Materials and Methods

In our retrospective case-control study, 194 cases of gastric cancer were enrolled from March 2013 to October 2017. The patients were of Kurdish ethnicity, data on age, sex, histopathological result, blood group, grade and stage at diagnosis were collected, association with ABO blood group and gastric cancer were assessed.

Results

This study showed that blood group A might be a risk factor of gastric cancer in both males and females. The intestinal type adenocarcinomas were the most frequent histopathological subtype of gastric carcinoma among blood group A. Grade 3 of differentiation found to be most frequent in blood group A patients (20.1%).

Conclusion

Individuals with blood group A has a higher risk of developing gastric cancer in their lifetime and their disease would be of high grade which might predict poor prognosis, while people with blood group AB have the lowest risk of developing gastric cancer.

Keywords: *Gastric cancer, Blood group, Kurdish population.*

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INTRODUCTION

Gastric cancer is the fourth most common type of cancer and is the second leading cause of cancer-related death worldwide according to WHO announcement in 2015^(1, 2). It's the ninth most common cancer in Iraq according to Iraqi cancer registry 2009. Gastric cancer is defined by growth of malignant cells in the lining of stomach, the term gastric cancer refers to adenocarcinoma of the stomach, other types are rare includes (squamous cell carcinoma, carcinoid tumor, sarcomatoid carcinoma, oncocytic carcinoma, gastric lymphoma and others)⁽³⁾. Gastric adenocarcinoma can affect all the parts of the stomach, proximal and distal part, because of vague nonspecific symptoms like abdominal discomfort, loss of appetite, weight loss, indigestion, anemia, many patients are diagnosed at an advanced stage, it's an aggressive disease with poor prognosis for which it needs continuous attention and research, gastric cancer can be caused by interaction between genetic and environmental factors⁽⁴⁻⁶⁾ so it's important to find the high risk groups of population. Many other risk factor have been introduced and some researches have been talking about ABO blood group and its association with gastric cancer, Aird et al. were the first to notice the correlation between gastric cancer and blood group A⁽⁷⁾. Since then, the relationship between ABO blood groups and carcinogenesis or progression of human tumors has been reported by many investigators, including increased breast cancer risk and other types of cancers in blood group A⁽⁸⁻¹⁰⁾.

ABO blood group system identified in 1900, classifies human blood based on the presence or absence of the antigens A and B carried on the surface of erythrocytes. It is interesting to note that the distribution of ABO blood groups varies among different ethnic groups and geographic areas ; therefore, the distribution of the blood groups A, B, O, and AB varies across the world according to the population. In this retrospective study the relation between ABO blood group and gastric cancer patients among Kurdish population has been assessed , and clinicopathological characteristic of the disease among different blood group being studied and correlated .

PATIENTS AND METHODS

In this study 194 cases with pathologically proven gastric adenocarcinoma from March 2013 through October 2017 who were managed in Hiwa cancer teaching hospital were collected in Sulaimani governorate, their age were ranging from 23-94 years. The patients'

blood group were recorded at the time of registration at Hiwa hospital, both Rh positive and negative were included in the study, other patients data were collected as gender, age at diagnosis, grade of differentiation, stage at diagnosis, and pathological subtype (diffuse type, intestinal type and mixed adenocarcinoma). The hisopathological examination performed and reviewed at Shorsh Teaching Hospital. Grades of differentiation were categorized as grade1 (well differentiated), grade 2 (intermediately differentiated), and grade3 (poorly differentiated). Staging at the time of diagnosis were considered according to TNM staging system of American joint committee on cancer (AJCC system, 7th edition 2010).

Normal control: The ABO blood group of normal Kurdish population was considered according to a published article which has been done on Kurdish population (n=53,234), all the subjects were of Kurdish ethnicity form different provinces of Kurdistan region of Iraq (Sulaimani, Erbil, Duhok and Kirkuk)⁽¹¹⁾.

Statistical analysis were performed using SPSS version 20, correlation between variables analyzed by (Pearson Chi-square test) with $p < 0.05$ considered statistically significant.

RESULTS

Among the 194 cases of gastric adenocarcinoma 119 patients were male and 75 were female, with male to female ratio (1:59), their age were ranging from 23-94 in this order; 20-30 years (5.15%), 31-40 years (7.73%), 41-50 years (13.92%), 51-60 yeras (15.46%), 61-70 yeras (29.90%) and 71 years and older (27.84%), with the median age at diagnosis of 63 years.

The common blood group among gastric cancer patients was blood group A (40.2%) followed by blood group O (32.5%) and blood group B (23.2%) with blood group AB the least common among gastric cancer patients (4.1%) as shown in Table 1. While the most common blood group in control group was blood group O (37.16%) followed by blood group A (32.47) and blood group B (32.84) blood group AB (6.53%) irrespective of Rh phenotype.

While concerning blood group and Rh phenotype blood group A+ve was most frequent blood group (36.1%) followed by O +ve (31%), B+ve (21.6%), AB+ve (4.1%), A-ve (4.1%), B-ve (1.5%) and O-ve (1.5%), comparing to the control group that showed blood group O+ve to be the most frequent (34.3%) followed by A+ve

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(29.99%), B+ve (21.69), AB+ve (6.02), O-ve (3.16%), A-ve(2.48%), and B-ve (2.15%) with AB-ve being the lowest prevalence (0.51%) .

Concerning the difference between women and men with gastric adenocarcinoma, blood group A was the most frequent blood group among both women (17.1%) and men (23.1%), Table 2.

Considering histopathologic characteristic of gastric cancer, the current study showed that most frequent hisopathological subtype of gastric carcinoma among blood group A is intestinal type adenocarcinoma (24.2%) with p value of <0.001, Table 3. In respect to

grades of differentiation blood group A associated with poorly differentiated pathology comparing to other blood groups with grade 3 of differentiation found to be most frequent (20.1%) followed by grade 2 (17%) and grade 1 (3.1) $p < 0.001$, in the other blood group types most frequent pathological grade is grade 2, Table 4.

Most of the patients with all the different blood group type were diagnosed at an advanced stage, stage 3 (46.4%) and stage 4(24.7%), followed by stage 2 (23.8) and stage 1(5.1%), Table 5.

Table 1. Prevalence of gastric cancer.

Blood group	Frequency	Percent (%)
A	78	40.2
B	45	23.2
AB	8	4.1
O	63	32.5
Total	194	100

Table 2. Distribution of blood groups among the patients with gastric carcinoma according to their gender.

Blood groups	Gender		Total	P-value
	Male	Female		
A	45 (23.1%)	33 (17.1%)	78 (40.2%)	
B	30 (15.5%)	15 (7.7%)	45 (23.2%)	
AB	7 (3.6%)	1 (0.5%)	8(4.1%)	0.26
O	37 (19.1%)	26 (13.4%)	63 (32.5%)	
Total	119 (61.3%)	75 (38.7%)	194 (100%)	

Table 3. Histopathological subtypes of gastric adenocarcinoma.

Blood groups	Histopathological subtypes of gastric adenocarcinoma			Total	P-value
	Intestinal type	Mixed type	Diffuse type		
A	47 (24.2%)	6 (3.1%)	25 (12.9%)	78 (40.2%)	
B	23 (11.9%)	1 (0.5%)	21 (10.8%)	45 (23.2%)	
AB	4 (2%)	2 (1%)	2 (1%)	8 (4.1%)	<0.001
O	28(14.5%)	7 (3.6%)	28 (14.4%)	63 (32.5%)	
Total	102 (52.6%)	16 (8.2%)	76 (39.2%)	194(100%)	

Table 4. Grades of differentiation

Blood groups	Grades of gastric adenocarcinoma			Total	P-value
	1	2	3		
A	6 (3.1%)	33 (17%)	39 (20.1%)	78 (40.2%)	
B	5 (2.6%)	22 (11.3%)	18 (9.3%)	45 (23.2%)	
AB	0 (0%)	6 (3.1%)	2 (1%)	8 (4.1%)	<0.001
O	4 (2%)	35 (18.1%)	24 (12.4%)	63 (32.5%)	
Total	15 (7.7%)	96 (49.5%)	83 (42.8%)	194 (100%)	

Table 5. Stages of gastric cancer at diagnosis.

Blood groups	Stages at diagnosis				Total	P-value
	Stage 1	Stage 2	Stage 3	Stage 4		
A	7 (3.6%)	17 (8.8%)	37 (19%)	17 (8.8%)	78 (40.2%)	
B	0 (0%)	7 (3.6%)	23 (11.87%)	15 (7.7%)	45 (23.2%)	
AB	0 (%)	2 (1%)	4 (2.1%)	2 (1%)	8 (4.1%)	<0.001
O	3 (1.5%)	20(10.3%)	26 (13.4%)	14 (7.2%)	63 (32.5%)	
Total	10 (5.1%)	46 (23.8%)	90 (46.4%)	48 (24.7%)	194 (100%)	

DISCUSSION

Gastric cancer is an aggressive disease worldwide, and it's the 6th most common cause of cancer death in Kurdistan region ⁽¹²⁾, many risk factors have been associated with development of gastric cancer like (H-pylori infection, Age, Diet containing large amount of meat and salt, chronic atrophic gastritis, family history, smoking cigarettes, alcohol and others)⁽¹³⁾. In this cohort study we tried to find the influence of ABO blood group as a risk factor for gastric carcinoma.

Our study included 194 gastric cancer patients who were registered in Hiwa cancer teaching hospital, there was statically significant association between risk of gastric cancer and blood group A in Kurdish population. Unfortunately this association has not been studied by other researchers in nearby regions to compare but worldwide this association has been studied by many researchers most of them showed strong association between blood group A and increased risk of gastric cancer ⁽¹⁴⁻¹⁷⁾. The explanation of this association is not well understood but there are several explanations, in a clinical study which correlate gastric secretory function to the ABO blood group which could be one of the answer to this association, compared to individuals with blood group A, the individuals of blood group O produced more free acid in their stomachs. The mean value of plasma pepsinogen in individuals with blood group O (564 units/mL) was higher than that in individuals with blood group A (494 units/mL) ⁽¹⁸⁾. Another explanation explained by Roberts et al. proposed that individuals with blood group A were more susceptible to pernicious anemia, compared with non-A blood group individuals ⁽¹⁹⁾.and pernicious anemia increases risk of gastric cancer ⁽²⁰⁾. While still some other researchers didn't find this association like a study done in china didn't show any association between blood group and risk of gastric cancer ⁽²¹⁾.

Regarding histopathological features, there are two types of gastric adenocarcinoma (intestinal type, diffuse type), this classification characterizes the two histological subtypes of adenocarcinoma that manifest differently in pathology, etiology, genetics and epidemiology ⁽²²⁾. In the current study the most frequent histological subtype among patients with blood group A was intestinal type adenocarcinoma, while Zheng H ⁽²³⁾ reported that genetic factors may contribute more to diffuse-type than to intestinal-type which may warrant more investigation in our population.

Concerning grades of differentiation and stage of the disease, patients with blood group A had poorly differentiated tumor comparing with non-A blood groups, a poorly differentiated tumor is more prone to loco regional invasion and distant metastasis, so individuals with blood group A are more prone to get gastric cancer and usually their disease are of high grade and at an advanced stage, also this has been shown by other study which showed blood group A had the worst prognosis among all the blood groups while patients with AB blood group had better outcome than non-AB blood groups ⁽²⁴⁾. Meanwhile, Xu et al. ⁽¹⁹⁾ reported that there was no significant difference between ABO blood groups and survival but this has not been discussed in this study.

In conclusion, the present study proved that individuals with blood group A are at higher risk of developing gastric cancer comparing to non-A blood group in Kurdish population, while those with blood group AB has the lowest risk, and among gastric cancer patients those with blood group A has higher grade of differentiation further studies are necessary to define the mechanisms by which ABO blood type or closely linked genetic variants may influence gastric cancer risk and prognosis.

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